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CLAIMS

[Claim(s)]

- [Claim 1] 0.2kg/cm² Base fabric for air bags characterized by carrying out the laminating of the film to the fiber base material front face on which the air content passed when it adjusts to a pressure and passes has the porosity below 100 cc/cm² / sec.
- [Claim 2] The base fabric for air bags according to claim 1 these whose porosity is below 50cc/cm² / sec.
- [Claim 3] The base fabric for air bags according to claim 1 this whose film is what has the thickness of 5 microns or less.
- [Claim 4] The base fabric for air bags according to claim 1 this whose film is what has the thickness of 1 micron or less.
- [Claim 5] The base fabric for air bags given in either of claims 1, 3, and 4 these whose films are that by which the laminating is carried out to this fiber base material in the state of un-pasting up.
- [Claim 6] The base fabric for air bags given in either of claims 1, 3, and 4 these whose films are that by which the laminating is carried out to this fiber base material through the glue line.
- [Claim 7] The base fabric for air bags according to claim 6 these whose adhesives are what is given selectively.
- [Claim 8] The base fabric for air bags given in either of claims 1, 3, and 4 these whose films are that in which the laminating is carried out to this fiber base material by the lamination.
- [Claim 9] claim 1 this whose film is the layered product of two or more films, and 3- the base fabric for air bags given in either 6 and 8.
- [Claim 10] The base fabric for air bags given in either of claims 1, 5, 6, and 8 these whose fiber base materials are textiles.
- [Claim 11] The base fabric for air bags according to claim 10 with which these textiles are simultaneously satisfied of the requirements for following (a) - (f).
- (a) eyes W (g/m²) $W \leq 250$ (b) thickness Th (mm) $Th \leq 0.35$ (c) tensile strength S (N/cm) $S \geq 500$ (d) breaking extension whenever E (%) $E \geq 15$
- (e) tear strength Tc (N) $Tc \geq 100$ (f) cover factor (Cf) $1000 \leq Cf \leq 2500$ — [Claim 12] The base fabric for air bags according to claim 10 or 11 these whose textiles are what has the cover factor of 1500-2000.
- [Claim 13] The base fabric for air bags according to claim 10 to 12 these whose textiles are what consists of lines of thread whose total fineness is 100-500 deniers.
- [Claim 14] The base fabric for air bags according to claim 10 to 13 these whose textiles are what consists of fiber whose single-yarn fineness is 0.5-7 deniers.
- [Claim 15] The base fabric for air bags according to claim 10 to 14 these whose textiles are plain weave fabrics of 1x1.
- [Claim 16] The base fabric for air bags given in either of claims 1, 5, 8, and 10 these whose fiber base materials are what consists of a kind of fiber chosen from a polyamide fiber or polyester fiber at least.
- [Claim 17] The air bag characterized by carrying out the film side of the base fabric for air bags according to claim 1 to 16 inside, and being formed.
- [Claim 18] The air bag according to claim 17 whose member which regulates a reinforcement cloth or an air bag expansion configuration in this air bag is the same base material as this fiber base material.
- [Claim 19] The air bag according to claim 17 or 18 with which sewing of this air bag is carried out, and it is constituted in the periphery section of the air bag expansion configuration piece of one sheet formed of blanking or fusing in this base fabric for air bags, or two or more sheets.
- [Claim 20] The air bag according to claim 19 with which this sewing consists of only doubling sewing of one layer or a duplex.

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* NOTICES *

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention absorbs crew's impact at the time of a car collision, and relates to the base fabric for air bags and an air bag excellent in low permeability, lightweight nature, flexibility, and storability in more detail about the air bag which aims at the protection.

[0002]

[Description of the Prior Art] Conventionally, for improvement, thermal resistance, fire retardancy, air shutoff nature, etc. cut out spreading and the base fabric which carried out the laminating, carried out sewing of the elastomer resin, such as synthetic rubber, such as a chloroprene, the Krol sulfonation olefin, and silicone, at the bag body, and were made by the plain weave fabric which used 400-1000-denier Nylon 66 or nylon 6 filament yarn for the air bag.

[0003] However, although the coating method by the knife coat, the roll coat, a reverse coat, etc. is generally adopted as one side of a base fabric in case a laminating is carried out, spreading and, these elastomer resin in the case of chloroprene elastomer resin, to the air bag base fabric which consists of filament textiles, it is usually 90 - 120 g/m² to a base fabric front face. It is applied, thickness became thick and there was a problem to which package volume becomes large also in a storable field. Moreover, in the case of heat-resistant and cold-resistant silicone elastomer resin [outstanding], compared with chloroprene elastomer resin, coverage is 40 - 60 g/m² more. Although it lightweight-ized and improved considerably also in respect of storability, it could not say that it was still enough, and spreading of an elastomer and a laminating had the complicated process and the problem was in the field of productivity.

[0004] On the other hand, for low-pricing and cutback-izing of module covering, the improvement in storability of the base fabric for air bags was requested strongly, the base fabric for air bags got down, and the air bag which used the non coat base fabric has attracted attention. As the response technique, examination of the high-density non coat air bag which consists of polyamide fiber textiles and polyester fiber textiles, such as Nylon 66 and nylon 6, is advanced. For example, compared with a coating article, although the textile fabrics of low permeability with which JP,4-2835,A is not carried out in coating are proposed, although profitability improves, it cannot be said that low permeability is enough. On the other hand, although this invention persons have proposed the air bag which ***** and becomes JP,5-213136,A from the layered product of coarse-mesh textiles and a film, and low permeability has improved compared with a non coat article, the actual condition is that a mechanical property is enough but that the base fabric for air bags been [the base fabric / it] hard and satisfied is not obtained.

[0005]

[Problem(s) to be Solved by the Invention] The object of this invention uses the base fabric for air bags and an air bag excellent in low permeability, lightweight nature, flexibility, and storability as an offer plug, holding the mechanical property as an air bag in view of the fault of this conventional air bag.

[0006]

[Means for Solving the Problem] This invention has the following configurations, in order to attain the above-mentioned object. That is, the base fabric for air bags of this invention is 0.2kg/cm². It is characterized by carrying out the laminating of the film to the fiber base material front face on which the air content passed when it adjusts to a pressure and passes has the permeability below 100 cc/cm² / sec.

[0007]

[Embodiment of the Invention] It studies that the base fabric for air bags which was preeminently excellent in low permeability, lightweight nature, flexibility, and storability can be offered, holding the mechanical property as an air bag by carrying out the laminating of the film to the fiber base material front face of low permeability comparatively, when this invention examines wholeheartedly offering the base fabric for air bags which has the low permeability which was excellent, without giving coating processing.

[0008] In addition, according to examination of this invention person, in a fiber base material, even if a laminating or adhesives is given selectively, the laminating of this film is carried out to the front face through the laminating or the glue line in the state of un-pasting up and laminates this effectiveness further, it can demonstrate the outstanding effectiveness.

[0009] As a fiber base material in this invention, Nylon 66, nylon 6, Nylon 12, Nylon 46, and nylon 6 and the copolymer of Nylon 66, The polyamide fiber which copolymerized the polyalkylene glycol, dicarboxylic acid, an amine, etc. to nylon, Gay polyester, such as polyethylene terephthalate and polybutylene terephthalate, The polyester fiber which copolymerized aliphatic series dicarboxylic acid, such as isophthalic acid, 5-sodium sulfoisophtharate, or an adipic acid, etc. for the acid component which constitutes the repeat unit of polyester, The aramid fiber represented by copolymerization with PARAFENIRENTERE phthalamide and the aromatic series ether, The textiles, knitting, and the nonwoven fabric of the high density which consists of macromolecule array object fiber which has the sea island structure which makes a subject a rayo fiber, ape phone system fiber ultra-high-molecular-weight-polyethylene fiber, and the above-mentioned synthetic fiber can be used. As a gestalt of this fiber base material, textiles are more desirable. Moreover, although textiles, such as plain weave, twill, satin and those *****, and multi-spindle weaving, are used as a textile organization, also in these, it excels especially in a mechanical property, and a plain weave fabric is desirable from *****. Moreover, it excels in the plain weave fabric air bag property which consists of a polyamide fiber and polyester fiber also in textiles. In addition, the various additives usually used for the productivity in the production process and processing process of raw thread or a property improvement may be included in this fiber. For example, a thermostabilizer, an antioxidant, light stabilizer, lubricating agent, an antistatic agent, a plasticizer, a thickener, a pigment, a flame retarder, etc. can be made to contain.

[0010] As a fiber base material which this invention requires, it is 0.2kg/cm². Below 100 cc/cm² / sec., by using still more preferably the thing of the low permeability below 50 cc/cm² / sec., the air content passed when it adjusts to a pressure and passes only carries out the laminating of the very thin film, and can offer the above outstanding base fabrics for air bags.

[0011] furthermore -- moreover, from fields, such as a mechanical property required as an air bag as a fiber base material which this invention requires, and lightweight nature, when above-mentioned textiles satisfy the following requirements simultaneously, the performance can be demonstrated.

[0012]

(a) Eyes W (g/m²) $W \leq 250$ (b) thickness Th (mm) $Th \leq 0.35$ (c) tensile strength S (N/cm) $S \geq 500$ (d) breaking extension whenever E (%) $E \geq 1$ (e) tear strength Ta (N) $Ta \geq 100$ (f) cover factor (Cf) $1000 \leq Cf \leq 2500$ — here, with a cover factor (Cf) $D1$ and a warp consistency are set 1 $N1$ for the warp total fineness, and they are $D2$ and a woof consistency about the woof total fineness $N2$ If it carries out it expresses with Cf $(D1)1/2 \times N1 + (D2)1/2 \times N2$ — having — a mechanical property and lightweight nature, and a storable field to good **** — 1000–2500 — it is 1500–2000 still more preferably. Moreover, as a weaving machine, a water jet loom, an air jet loom, and a rapier loom can be used suitably.

[0013] Moreover, although especially the total fineness and single-yarn fineness that constitute textiles are not restrained, the total fineness desirable, still more preferably, 100–500 deniers and single-yarn fineness are desirable, and 100–600 deniers of 0.5–8 deniers of 2–6 deniers of 3–6-denier things are used especially preferably still more preferably. As reinforcement of these fiber, the thing of 6.5 or more g/d is used preferably.

[0014] On the other hand, although especially the construction material of the film which carries out a laminating to a fiber base material does not receive constraint, polyethylene terephthalate, polypropylene, polyethylene, polystyrene, a polyvinyl chloride, a polyvinylidene chloride, polyvinyl alcohol, a polycarbonate, nylon 6, aromatic polyimide, polyurethane, polyphenylene sulfide, tetra-FURORO ethylene, 3 fluoride ethylene, etc. can be used for it. Effectiveness is demonstrated especially in polyethylene terephthalate from the field of a mechanical property also in these. Moreover, these films may be unstretched films, or may be one shaft or a biaxially oriented film, or such combination is further sufficient as them. Generally, since an oriented film is excellent in tensile strength, bursting strength, and tear **** resistance compared with an unstretched film, it is desirable to use an oriented film, but since it is related also to combination with a fiber base material, these properties are good to use it suitably, of course — ***** from this film, for example, an unstretched film, an uniaxially stretched film, and a biaxially oriented film — even if few, the thing of the film layered product of two or more layers of various kinds of combination, such as two sorts of laminations, can be used. The coating film is clearly distinguished for this film.

[0015] As for the thickness of this film, it is indispensable that it is 10 microns or less, and it is 1 micron or less still more preferably 5 microns or less preferably. If the film exceeding 10 microns is used, aesthetic property will become hard for thickness and it is not especially desirable in respect of storability, moreover, the laminating of this film — a fiber base material front face — a film — the condition of not pasting up — a laminating — that is, it is only only easy to carry out a laminating (un-pasting up), or a laminating may be carried out through a glue line, or adhesives are given selectively and carry out a laminating — also having — it was good and could laminate further.

[0016] As an approach of carrying out the laminating of the film to a fiber base material, a metal roll, a plastics roll, or a press method is used suitably. In addition, the base fabric for air bags which carried out the laminating of this film to the fiber base material can be suitably used for the air bag for driver's seats, a passenger-side air bag, the air bag for backseats, and the air bag for side facias.

[0017] Moreover, in the above-mentioned air bag, from the field of sewing nature, it is advantageous that the member which regulates the reinforcement cloth used for inflator installation opening, a vent-hole part, etc. or a bag expansion configuration is the same base material as this fiber base material, and it is desirable. Moreover, it is desirable to carry out sewing of the periphery section in sewing of an air bag using the base fabric for air bags of one sheet formed of blanking or fusing or two or more sheets to apply, and the air bag with which sewing of the periphery section consisted of only doubling sewing of one layer or a duplex is still more desirable.

[0018] The description of the base fabric for air bags of this invention is in the point that the outstanding low permeability and lightweight nature, flexibility, and storability can be given, holding a mechanical property. That is, the base fabric obtained by this invention can be carried out without giving coating processing, and the thing excellent in the mechanical property as an air bag and low permeability, lightweight nature flexibility, and storability can be offered.

[0019]

[Example] Next, an example explains this invention in more detail. In addition, the property of the base fabric for air bags in an example measured the following approach.

[0020] Pile Amount : JIS It asked by L6328 (5.3.4 law).

[0021] thickness ** : JIS It asked by L6328 (5.3.3 law).

[0022] Tensile strength : JIS It asked by L6328 (5.3.5 law).

[0023] Whenever [breaking extension] : JIS It asked by L6328 (5.3.5 law).

[0024] Tear strength : JIS It asked by L6328 (5.3.6 law).

[0025] Permeability : air flow rate which adjusts a fluid (air) to the pressure of 0.2kg/cm², and passes a sink and then using a laminar-flow tubing type permeability measurement machine (cc/cm² / sec) It measured.

[0026] Bending resistance : JIS It asked by L1096 (6.19.1A law).

[0027] Storability : the air bag bag body was bent in the predetermined form, and the folding height when applying 98-N press was measured. As a reference standard, the relative value when being referred to as 100 showed the dimension height of a silicone rubber coat article (45 g/m² coating article).

[0028] The plain weave fabric both whose fabric density of warp and the woof is 45 [/inch] was obtained in the water jet loom using the filament yarn which consists of Nylon 66 fiber of the example 1 total fineness of 420 deniers, 72 filaments, the reinforcement of 9.5g/denier, and 22.5% of ductility. These textiles were 0.26mm in permeability 45 cc/cm² / sec, eyes 175 g/m², and thickness. On the other hand, as a film, using the biaxial oriented film which consists of polyethylene terephthalate with a melting point [of 260 degrees C], and a thickness of 1.5 microns, using a polyethylene film with a melting point [of 150 degrees C], and a thickness of 1.0 microns as a glue line, lamination was performed with the metal roll heated at 175 degrees C, and the base fabric for air bags was obtained. After an appropriate time, judge two circle-like textiles with a diameter of 725mm by the blanking method from this base fabric for air bags, and the three-sheet laminating of the circle-like reinforcement cloth with a diameter of 200mm which consists only of a plain weave fabric in the center of one circle-like textile is carried out. Vertical yarn depended and carried out sewing-machine sewing of the diameter [of 110mm], 143mm, and 175mm line top to the lock stitch with the sewing thread which consists of 420D of Nylon 66 fiber / 1x3, and the hole with a diameter of 90mm was prepared and it considered as inflator anchoring opening. Furthermore, with the sewing thread with which vertical yarn consists of [cloth / with a diameter of 75mm which conflicts in the direction of bias from a core in the location of 255mm, and consists of the same textile / circle-like reinforcement] 420D of Nylon 66 fiber / 1x3 in an one-sheet reliance diameter [of 50mm], and 60mm line top, sewing-machine sewing was carried out and two vent holes by the lock stitch which prepared the hole with a diameter of 40mm were installed. Subsequently, the reinforcement textile side of a ****-like textile was carried out outside, the circle-like textile and **** of another side were shifted 45 degrees, and after [which depends superposition, the diameter of 700mm, and the shape of a 710mm periphery on a duplex chain stitch with the sewing thread with which vertical yarn consists of 1260D/1 of Nylon 66 fiber] carrying out sewing-machine sewing, the air bag for driver's seats of inside-out and 60L capacity was produced for the bag body.

[0029] Thus, the property of the obtained base fabric for air bags and an air bag was evaluated, and it was shown in a table 1. The air bag of this invention has a mechanical property required for an air bag, and low permeability, and was excellent in lightweight nature and storability.

[0030] The plain weave fabric of permeability 45 cc/cm² / sec. both whose fabric density of warp and the woof is 45 [/inch] was obtained in

the water jet loom using the same filament yarn as the example 1 of a comparison, and two examples 1. On the other hand, as a film, using the biaxial oriented film which consists of polyethylene terephthalate with a melting point [of 260 degrees C], and a thickness of 35 microns, using a polyethylene film with a melting point [of 150 degrees C], and a thickness of 1.0 microns as a glue line, lamination was performed with the metal roll heated at 175 degrees C, and the base fabric for air bags was obtained.

[0031] Moreover, the plain weave fabric both whose fabric density of warp and the woof is 45 [/inch] was obtained in the water jet loom, using the same filament yarn as an example 1 as an example 2 of a comparison. Subsequently, after refining these textiles by the usual approach at drying, the heat set was carried out for 25 seconds at 180 degrees C. A comma coating machine is used for these textiles after an appropriate time, and the amount of coating is 45 g/m². After methylvinyl system silicone rubber's having performed coating so that it might become, and drying at 120 degrees C, it vulcanized for 3 minutes at 180 degrees C, and the base fabric for air bags was obtained. Subsequently, the air bag for driver's seats of 60L capacity was produced like [base fabrics / these / for air bags] the example 1.

[0032] Thus, the property of the obtained base fabric for air bags and an air bag was similarly estimated as the example 1, and was shown in table 1. Although the air bag of the examples 1 and 2 of a comparison was excellent in low permeability, it was inferior to lightweight nature and storability, and the air bag of the example 2 of a comparison had the complicated processing process, and the problem was in the field of productivity.

The plain weave fabric both whose fabric density of warp and the woof is 54 [/inch] was obtained in the water jet loom using the filament yarn which consists of nylon 6 fiber of the example 2 total fineness of 315 deniers, 72 filaments, the reinforcement of 9.3g/denier, and 23.1% of ductility. Subsequently, it refined and dried with the conventional method and the 180-degree C heat setting was performed. This thing was 0.27mm in permeability 25 cc/cm² / sec., eyes 189 g/m², and thickness. On the other hand, the biaxial oriented film which consists of polyethylene terephthalate with a melting point [of 265 degrees C] and a thickness of 0.85 microns is used as a film, and they are urethane system adhesives to one side of this film 5g/m² it applied and lamination and the base fabric for air bags were obtained. After an appropriate time, making decision of one body cloth and two side-face cloths was carried out, and the passenger seat air bag of 120L capacity was produced.

[0033] Thus, the property of the obtained base fabric for air bags and an air bag was similarly estimated as the example 1, and was shown in table 1. The air bag of this invention has a mechanical property required for an air bag, and low permeability, and was excellent in lightweight nature and storability.

[0034] The biaxial oriented film which consists of polyethylene terephthalate with a melting point [of 265 degrees C] and a thickness of 15.5 microns as a film is used using the same plain weave fabric as the example 3 of a comparison, and four examples 2, and they are urethane system adhesives to one side of this film 5g/m² it applied and lamination and the base fabric for air bags were obtained [the example 3 of a comparison].

[0035] Application-of-pressure compression processing was performed to one side by part for 15m/in the pressure of 35t, and rate between the flat front face [which, on the other hand, heated the same plain weave fabric as an example 2 at 170 degrees C] metal roll, and the plastics roll of a room temperature, and the base fabric for air bags was obtained [the example 4 of a comparison]. After an appropriate time, the passenger seat air bag of 120L capacity was produced like the example 2.

[0036] Thus, the property of the obtained base fabric for air bags and an air bag was similarly estimated as the example 1, and was shown in table 1. Although the air bag of the example 3 of a comparison was excellent in low permeability, it was inferior to lightweight nature and storability, and the air bag of the example 4 of a comparison was a little inferior to tear strength by rough **.

[0037] The textiles of the common organization both whose fabric density of warp and the woof is 46 [/inch] were obtained with the rapier loom using the filament yarn which consists of a polyethylene terephthalate fiber of the example 3 total fineness of 420 deniers, 144 filaments the reinforcement of 8.8g/denier, and 18% of ductility. Subsequently, after refining these textiles with the conventional method and drying, the heat set was carried out for 25 seconds at 180 degrees C. This thing was 0.26mm in permeability 43 cc/cm² / sec., eyes 189 g/m², and thickness. On the other hand, as a film, using the unstretched film which consists of polyethylene terephthalate with a melting point [of 265 degrees C], and a thickness of 0.95 microns, the laminating was carried out in the condition that the common organization made it only pile up this each other's film, and the base fabric for air bags was obtained. After an appropriate time, melting decision of one body cloth and two side-face cloths was carried out, and the air bag for sides of 15L capacity was produced. Thus, the property of the obtained base fabric for air bags and an air bag was similarly estimated as the example 1, and was shown in a table 1. The air bag of this invention has a mechanical property required for an air bag, and low permeability, and was excellent in lightweight nature and storability.

[0038] The laminating was carried out in the condition that the common organization made it only put this each other's film on the same plain weave fabric as example of comparison 5 example 3 using the unstretched film which consists of polyethylene terephthalate with a melting point [of 265 degrees C], and a thickness of 20 microns, and the base fabric for air bags was obtained. After an appropriate time, melting decision of one body cloth and two side-face cloths was carried out, and the air bag for sides of 15L capacity was produced.

[0039] Thus, the property of the obtained base fabric for air bags and an air bag was similarly estimated as the example 1, and was shown in a table 1. The air bag of the example 5 of a comparison did not have lightweight nature and enough storability.

[0040]

[A table 1]

	Example 1	Comparison Example 1	Comparison Example 2	Example 2	Comparison Example 3	Comparison Example 4	Example 3	Comparison Example 5
Properties of backing fabric for air bag								
Tensile strength (N/cm)	635/545	615/621	612/618	518/616	602/608	612/609	601/603	608/610
Breaking extension (%)	26/25	25/24	25/23	32/31	31/30	31/30	30/29	29/28
Tear strength (N)	231/233	221/219	248/246	208/210	203/206	185/192	207/203	203/201
Gas permeability (cc/cm ² /sec)	0	0	0	0	0	8.3	0	0
Bending resistance (mm)	68/72	87/95	79/88	73/80	81/88	89/96	71/74	85/91
Storability	82	118	100	83	105	118	85	106
Air bag (location)	For driver	For driver	For driver	For passenger	For passenger	For passenger	Side panel	Side panel

	実施例 1	比較例 1	比較例 2	実施例 2	比較例 3	比較例 4	実施例 3	比較例 5
フィルム膜厚さ (μ)	1.5	3.5	4.5 (±1)	0.8	15.5	—	3.5	2.0
フィルム延伸形態	2軸延伸	2軸延伸	2軸延伸	2軸延伸	2軸延伸	2軸延伸	未延伸	未延伸
素材	N66	N66	N66	N6	N6	N6	PET	PET
織度 (D)	420	420	420	315	315	315	420	420
重量 (g/m ²)	175	210	220	189	205	189	192	210
厚さ (mm)	0.28	0.30	0.31	0.28	0.29	0.27	0.26	0.28
密度 (g/in)	45/45	45/45	46/43	54/54	54/54	54/54	46/46	46/46
カーボンファクター	1844	1844	1844	1918	1918	1918	1885	1885
引張強度 (N/cm)	665/645	615/621	612/618	618/618	602/608	612/609	801/803	808/610
破断伸度 (%)	26/25	25/24	25/23	32/31	31/30	31/30	30/29	28/28
引張強度 (N)	231/233	221/219	248/246	208/210	203/206	185/192	207/203	203/201
透気度 (cc/cm ² /sec)	0	0	0	0	0	8.3	0	0
剛軟度 (mm)	68/72	87/96	79/88	73/80	81/83	89/96	71/74	85/91
吸納性	82	118	100	83	105	118	85	106
エアバッグ (部位)	運転席用	運転席用	運転席用	助手席用	助手席用	助手席用	サイド用	サイド用

[0041]

[Effect of the Invention] According to this invention, holding the required mechanical property as an air bag, compared with what could offer the air bag excellent in low permeability, lightweight nature, flexibility, and storability, and performed the conventional coating, or a calendaring article, offer of a cheap air bag can be attained and the crew protection system by the air bag can be spreading and promoting.

[Translation done.]